## AMENDMENTS TO THE SPECIFICATION

[001] The invention relates to a circuit arrangement for a capacitive proximity switch~~according to the preamble of claim 1, particularly~~. Particularly, this proximity switch is working according to the charge transfer principle.

[002] Circuit arrangements of this type are known and have, ~~e.g.~~for example in the case of ~~EP 859 468 A1,~~US 5,973,417, a capacitive sensor element, whose capacitance changes as a function of its operating state. This capacitance change is evaluated in order to establish the operating state. For this purpose a charging voltage is supplied to the sensor element, so that as a function of its capacitance and the charging voltage, a specific electric charge is transferred to the sensor element. Following the charging time the sensor element is separated from the charging voltage and connected to a collecting or central capacitor, so that there is a charge transfer from the sensor element to the central capacitor. The charging and subsequent recharging process is repeated for a predetermined number of cycles, so that the charging of the central capacitor reaches a specific value, which inter alia is determined by the sensor element capacitance value. The charging or resulting voltage of the central capacitor is consequently a measure of the sensor element capacitance to be measured. By evaluating the voltage of the central capacitor, conclusions can be drawn concerning the operating state of the proximity switch. Following voltage evaluation the central capacitor is discharged in a defined manner and a new measuring cycle can follow.

[006] The circuit arrangement according to the invention comprises a first controllable connecting means which, as a function of a triggering signal, supplies a charging voltage to a capacitive sensor element, and a second controllable connecting means which, as a function of the triggering signal, links the capacitive sensor element with a central capacitor for transferring the charge from the capacitive sensor element to the central capacitor. The charging voltage is an ~~a.c.~~AC voltage and the connecting means can be supplied with the ~~a.c.~~AC voltage in such a way that in alternating manner the first or second connecting means are conductive. The switching between a charging phase of the sensor element and the charge transfer phase takes place in the cycle of the ~~a.c.~~AC voltage, so that there is no need for additional switching logics.

Such a circuit arrangement is easy to construct, inexpensive to manufacture and insensitive to interference.

[007] According to a further development of the circuit arrangement, the charging voltage is generated with the aid of a ~~d.c.~~DC voltage source and a square-wave voltage source with a common reference potential. Between a charging voltage node and the ~~d.c.~~DC voltage source is looped in a clamping diode in the blocking direction and between the charging voltage node and the square-wave voltage source are looped in ~~in series~~ a capacitor and a resistor in series. As a result of such an arrangement it is possible to generate a square-wave charging voltage at the charging voltage node, which alternates between the potential of the ~~d.c.~~DC voltage source and a total potential of the potentials of the ~~d.c.~~DC voltage source and the "1" level or potential of the square-wave voltage in the cycle of the square-wave voltage source. This allows an approximately complete charging/discharging of the sensor element independently of the charging voltage or charging state of the central capacitor, which leads to a linear voltage rise at the central capacitor. This leads to a marked increase in the possible signal resolution.

[013] According to a further development of the circuit arrangement, the capacitive sensor element is a voluminous, elastic, preferably elongated body made from electrically conductive material. Such a sensor element is ~~e.g.~~ for example described in ~~EP 859 467 A1,~~US 5,917,165, whose content is, by express reference, made into part of that of the present description.

[015] Advantageous embodiments of the invention are diagrammatically shown in the following drawings, wherein represent:

Fig. 1 A circuit diagram of a circuit arrangement for capacitive proximity switches for the determination of their operating state.

Fig. 2 A graph of the voltage curve of an ~~a.c.~~AC voltage source U2 of fig. 1 and a charging voltage at a charging voltage node N1 of fig. 1.

Fig. 3 A graph of the voltage curve at a central capacitor C2 of fig. 1 as a function of the operating state of a proximity switch.

Fig. 4 A circuit diagram of a circuit arrangement with several capacitive sensor elements.

[016] Fig. 1 is a diagram of a circuit arrangement for capacitive proximity switches for the determination of their operating state. The circuit arrangement comprises a ~~d.c.~~DC voltage source U1 and a square-wave voltage source U2 with a common reference potential, ~~e.g.~~for example earth, and between the charging voltage node N1 to which a charging voltage is applied and the ~~d.c.~~DC voltage source U1 is looped a clamping diode 1 in the non-conducting direction and between the charging voltage node N1 and square-wave voltage source U1 are looped in ~~in series a~~ capacitor C1 and a resistor ~~R1.~~1 in series. In conjunction with the capacitor C1, the clamping diode D1 brings about a raising of the voltage at node N1 outputted by the square-wave voltage source U1 by the amount of the voltage of said source. Fig. 2 shows this in a graph of the voltage curve of the ~~a.c.~~AC voltage source U2 and the charging voltage U3 at the charging voltage node N1 over time.

[018] A capacitor C4 represents a substantially constant basic capacitance of the sensor element C3. A switch S1 is connected in parallel to the central capacitor C2 and is closed as from the start of the measurement and consequently said capacitor is completely discharged. If the voltage curve at this central capacitor is evaluated by a microcontroller, it can discharge the central capacitor C2 prior to the start of the measurement if the corresponding input is briefly switched to the reference potential. There is no switch S1 in this case. The capacitive sensor element C3 is ~~e.g.~~for example applied to an underside of a surface or cover having dielectric characteristics.

[021] Fig. 3 is a graph of the voltage curve at the central capacitor C2 as a function of the operating state of the proximity switch over time. When the proximity switch is not operated, there is a sawtooth-shaped voltage configuration between the reference voltage and a first ramp voltage UR1. In a period between times t1 and t2 with the proximity switch operated, at time t1

the ramp rise increases sharply and the voltage at central capacitor C2 rises to a ramp voltage UR3. The following measuring cycles take place up to time t2 with a considerable ramp rise, so that in each case a ramp voltage UR2 is reached. The ramp voltage reached consequently indicates the operating state of the proximity switch and can be evaluated by a not shown unit, ~~e.g.~~ for example a microcontroller.